Dept. Computer Science	**Operating Systems**
Vrije Universiteit	**03.06.2009**

1a An operating system can be seen as a virtual machine or as a resource manager. Explain the difference. *5pt*

1b After a device generates an interrupt, a series of actions are taken, in part by the hardware, in part by the operating system. Describe those actions up to the point that the interrupt has been completely handled. *10pt*

1c Explain how the test-set-lock (TSL) instruction works, and how it can be used to implement the operations enter_region and leave_region for protecting a critical section.(10pt) *5pt*

2a Where is the process table located, and what information does it store? *5pt*

2b List 3 categories of process scheduling algorithms, and describe their goals. *5pt*

2c Describe initialization of the process tree in MINIX3. *5pt*

3a Describe Swapping, Paging, and Segmentation in detail. What are the advantages/disadvantages of each? *10pt*

3b Briefly describe five memory page replacement algorithms. *5pt*

3c What is the purpose of the translation-lookaside buffer (TLB)? *5pt*

4a Describe the layers of a typical I/O software system. *5pt*

4c Why are indirect function calls used in main procedures of I/O drivers? *5pt*

4c Describe the usage of memory-mapped vs. serial terminals. *5pt*

5a Describe the steps in looking up /usr/melanie/mailbox. *10pt*

5b Discuss 3 file system caching strategies, and their tradeoffs. *5pt*

5c Consider the standard layout of a UNIX file system. Keeping track of available disk blocks and i-nodes is done through bit maps. How do you determine the maximum number of files that a file system can handle? *5pt*

Grading: *The final grade is calculated by adding the scores per question (maximum: 90 points), and adding 10 bonus points. The maximum total is therefore 100 points.*